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Paper No. 52

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte YVON J. NEDONCHELLE

Appeal No. 94-2985
Application 07/803,765¹

ON BRIEF

MAILED

SEP 19 1996

PAT.&T.M. OFFICE
BOARD OF PATENT APPEALS
AND INTERFERENCES

Before JOHN D. SMITH, PAK and WARREN, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from Examiner's refusal to allow claims 23 through 32, all the claims remaining in the application.

¹ Application for patent filed December 5, 1991. According to appellant, the application is a continuation of 07/523,307, filed May 10, 1990, which is a continuation of 07/252,005, filed September 28, 1988, which is a continuation of 06/828,793, filed February 12, 1986.

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THE CLAIMED SUBJECT MATTER

The claims are drawn to a pourable abrasive cleaning composition. Claim 23 is representative, and reads as follows:

23. A pourable, homogenous, abrasive aqueous detergent composition which does not sediment upon standing and which is suitable for cleaning hard surfaces, consisting essentially of:

- (i) 1.5 to 30% by weight of detergent active compound comprising synthetic anionic detergent active and nonionic detergent active in the ratio of 1:1 to 9:1 by weight;
- (ii) 15 to 45% by weight sodium bicarbonate salt at least 5% by weight of the total composition of which at 20°C comprises a solid phase in the form of undissolved particles having a mean particle diameter of from 20 to 300 μm ;
- (iii) the balance of the composition comprising from 25 to 92.5% by weight water;

the compositions having an apparent viscosity at 20°C of at least 6500 Pas at a shear rate of $3 \times 10^{-5} \text{ sec}^{-1}$, and not more than 10 Pas at a shear rate of 21 sec^{-1} .

We observe from the specification that the recited at least 5% by weight undissolved sodium bicarbonate limitation of part (ii) provides the abrasive characteristics, Specification at 9, lines 15-27 (Sp.9:15-27). The recited 6500 Pas condition provides the 'homogenous' qualities (i.e., no sedimentation upon standing), Sp.16:29 to 17:4. The recited 10 Pas condition provides pourability, (Sp.17:11-21). The specification further

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discloses that the preferred ratios of detergents recited in (i) provide a structured, self-thickened liquid detergent, Sp.7:20-33.

PRIOR ART

The examiner has relied on the following prior art:

Haslop et al. (Haslop)	4,618,446	Oct. 21, 1986
Straw et al. (Straw)	4,302,347	Nov. 24, 1981
Carleton et al. (Carleton)	4,264,466	Apr. 28, 1981

GROUND OF REJECTION

Appealed claims 23 through 33 have been rejected under 35 U.S.C. § 103 as unpatentable over Haslop in view of Straw and Carleton.

We have reviewed the record, including the claims, the specification, the arguments and art relied on by the examiner, and the arguments presented by appellant, including the three declarations submitted by Mr. Van Blarcom, Dr. Jones, and Dr. Allan. For the reasons set out post, we shall not sustain this rejection.

The Prior Art

We summarize Haslop, the critical prior art reference relied on by the examiner, in some detail. The teachings of the remaining references will be noted in passing in the discussion.

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Haslop discloses liquid detergent compositions comprising a space-filling, spherulitic, floc-like phase of surfactant that is capable of suspending solids, such as builders, to form stable compositions. Column 7, lines 21-31. A principal goal of Haslop is to provide solutions to the problem of formulating fully built liquid detergents. Column 8, lines 6-7. Teachings to light duty liquids and to unbuilt or built clear liquid laundry detergents are disregarded as irrelevant to Haslop's invention because the "Builder level is substantially less than desirable." Column 7, lines 60-66. Prior art methods of providing high levels of builder are criticized as ineffective, expensive, or lacking stability. See column 8, lines 12-56. Abrasive hard surface cleaners are said to be of no use to formulate laundry detergents due to their low levels of surfactants, absence of builders, and high concentrations of abrasives. Column 8, lines 57-65.

Haslop provides compositions having high builder to surfactant ratio, improved stability, high mobility, high pH and/or alkalinity, etc. Column 7, lines 32-40. Such compositions are obtained by optimizing the ratio of active ingredients (surfactants) and electrolytes to obtain a stable floc-like spherulitic surfactant phase labelled "Stage III." The Stage III phase is effective to suspend solid particles, and is the critical feature of Haslop's invention. Column 14, lines 5-

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26. Addition of further electrolyte destabilizes Stage III, and creates a lamellar phase that is not desired. Column 14, lines 27-46. Mixtures of surfactants, particularly non-ethoxylated anionic surfactants, are preferred, but minor amounts of ethoxylated nonionic surfactants may be present. Column 16, lines 58ff; see also claim 2. Haslop provides specific definitions of numerous terms at columns 1-5, the most critical of which for our consideration is "Builder."

The term "builder" is sometimes used loosely in the detergent art to include any non-surfactant whose presence in a detergent formulation enhances the cleaning effect of the formulation. More usually, however, the term is restricted to those typical "builders" which are primarily useful as a means of preventing or ameliorating the adverse effects on washing of calcium and magnesium ions, e.g. by chelation, sequestering, precipitation, or absorption of the ions, and secondarily as a source of alkalinity and buffering. The term "Builder" is used herein in the more restricted sense, and refers to additives which ameliorate the effects of calcium to a substantial extent.

Column 1, lines 17-35, emphasis added. Haslop notes that certain builders may also function as electrolytes (which are defined to be substances that are at least 5 w% soluble at 0°C in water, and that tend to lower the total solubility, including micellar solubility, of surfactants by a "salting out" effect: column 1, lines 50-55). Builders, such as sodium carbonate, are recognized

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to have limited solubility², and therefore must be supplemented with more soluble electrolytes, such as sodium chloride, to obtain the required spherulitic phase. Column 14, lines 53-58 and column 19, lines 34-48. The preferred builders are sodium tripolyphosphate, alone or as the major constituent, with sodium silicates and sodium carbonate as preferred adjuvant builders³. Column 19, line 50 to column 20, line 50; column 21, lines 4-7. Such builders are believed to be present in part as solid crystallites 1-50 μm in diameter. Column 19, lines 50-55. Haslop does not disclose any species of bicarbonate to be useful as a builder. The compositions are desirably buffered at a pH greater than 8.5, most preferably 10 to 11. Column 20, line 54 to column 21, line 7. All but three of the eighty four examples provided by Haslop use at least one of sodium tripolyphosphate or sodium carbonate as the builder and alkaline buffer. Zeolite A, the sole builder in the three exceptions, is added to about half the remaining examples. According to Haslop, "[i]n general, lower alkalinities are less acceptable in commercial practice,

²The solubility of sodium carbonate is about 10 w% at 25°C. Van Blarcom Declaration (Van Blarcom), item 9, citing Lange's Handbook of Chemistry, 12th Ed, Table 10-2.

³Hereinafter we shall use the terms "carbonate" and "bicarbonate" to refer to the sodium salts, Na_2CO_3 and NaHCO_3 , respectively.

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although not excluded from the scope of our invention." Column 21, lines 1-3.

The Examiner's Position

The examiner relies on Haslop to disclose pourable aqueous compositions comprised of anionic and nonionic detergents and water in amounts within the scope of instant claims. Answer at 3 (A.3), last paragraph. See Haslop, e.g., at column 23, lines 5-29 and the examples at column 38. The examiner also relies on Haslop for the disclosure of particulate builders, as cited supra. To remedy Haslop's lack of disclosure of bicarbonate as a builder, the examiner relies on Carleton to establish that bicarbonates are known as builder salts in liquid detergent compositions. A.3, last paragraph, citing Carleton, column 8, lines 37-47. The examiner relies on Straw to establish that solids in the range of 1 to 40 μm are abrasive (Straw, column 4, lines 12-23, discloses calcite (calcium carbonate), silica, and feldspar as examples of abrasives), and asserts that the solid builder particles of Haslop would therefore inherently have abrasive properties. A.3, last paragraph. The examiner also relies on the disclosure by Straw of carbonate:bicarbonate mixtures as builders. A.4, last paragraph, A.5, first paragraph. See Straw at column 3, lines 56-59 and the Examples at Columns 5-6.

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The examiner then concludes that "[i]t would have been obvious to one of ordinary skill in the art to substitute the equivalent . . . carbonate builders of Carlton [sic] for the tripolyphosphate called for by Halsop [sic] et al. Only the expected results would be obtained." Answer, sentence bridging pages 3 and 4.

Appellant's Position

The gravamen of appellant's arguments and of the declarations of Van Blarcom, Allan, and Jones, is that in the pH range preferred by Haslop, i.e., pH 10-11, a pourable, stable composition comprising at least 15% bicarbonate cannot be formed. This is due in part to the bicarbonate:carbonate equilibrium, which favors carbonate at $\text{pH} > 9.5$ (Jones declaration, item 6 and figure 1) and the low solubility of bicarbonate (about 9.6 w% at 20°C : Van Blarcom declaration, item 9). To obtain a solution that is 15 w% bicarbonate at pH 10, so much carbonate would have to be added that the resulting solution would not be pourable. See the Allan declaration, items 8 to 10. Moreover, saturated carbonate solutions are not stable and homogenous, due to "Ostwald Ripening." Van Blarcom declaration, items 10-12 and figures 2 and 3: compositions corresponding to the examples shown in figures 2 and 3 are disclosed in Appendix A. The examiner has accepted appellant's arguments, at least as applied to distinctly

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alkaline solutions, pH > 10 (A.5, lines 7-8, quoting from Paper No. 46, advisory action of May 3, 1993).

In regard to the pH range from 8.5 to 10, disclosed but not preferred by Haslop, appellant appears to urge that Haslop teaches away from employing this range, and is silent as to employing bicarbonate as a builder. Brief at 11-12. Appellant further urges that Haslop does not recognize the criticality of maintaining a low pH, when bicarbonate is employed as a builder. Reply Brief at 4.

DISCUSSION

"The examiner bears the initial burden, on review of the prior art or on any other ground, of presenting a prima facie case of unpatentability." In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). A proper analysis under § 103 requires consideration of "whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition . . . [and] whether the prior art would also have revealed that in so making . . . those of ordinary skill would have a reasonable expectation of success." In re Vaeck, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

The sole issue remaining for our consideration is whether it would have been obvious to one of ordinary skill in the art, on

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the basis of the art described supra, to substitute, at pH 8.5 to about 9.5, sodium bicarbonate as a builder in place of the sodium tripolyphosphate, alone and in combination with the other builders recited by Haslop.

Read in a vacuum, the disclosure by Carleton of bicarbonate as a builder, in conjunction with his examples, which use tetrasodium pyrophosphate⁴ as the builder (Carleton, Tables I to X at columns 35 to 40), appears to suggest the equivalence of bicarbonate and other builders, and appears to support the examiner's position that it would have been obvious to one of ordinary skill in the art to substitute bicarbonate for the trisodium polyphosphate:carbonate builder disclosed and exemplified by Haslop. The undisputed evidence of record, however, teaches away from such equivalence. We observe that Allan reports the following calculations of the building efficiency of the bicarbonate:carbonate system as a function of pH in water having an initial hardness of 24 Degrees French⁵, wherein bicarbonate is present at 10 g/liter (at pH 7):

⁴Tetrasodium pyrophosphate provides a 1% aqueous solution with a pH of 10.2. Solubility at 25°C is about 6.7 g/100 ml. See entry 8957 of the Merck Index, 9th Ed. (1976), attached herewith.

⁵1 Degree French is 10^{-4} mol/liter calcium ions. Allan, declaration item 13.

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pH	hardness (Degrees French)	composition
7	17.5	pure bicarbonate
9	3.3	7.5:2.5 bicarbonate:carbonate
12	0.5	pure carbonate

Allan declaration, items 18-21. Allan asserts that it is generally recognized that effective builders should reduce the calcium content of water to less than "1 Degree French." Allan declaration, item 13. Sodium tripolyphosphate, the builder preferred by Haslop, would readily reduce the hardness of "a wash liquor" to less than 0.1 Degree French under typical conditions of use. Allan declaration, item 14. Allan concludes that:

while bicarbonate has some builder activity, it is well known in the art that increasing the pH to convert bicarbonate to carbonate is a far more effective way of improving the activity of a carbonate/bicarbonate builder system than simply adding bicarbonate as bicarbonate is the less effective builder of the pair.

Allan declaration, item 22. The examiner has not come forward with any evidence to rebut the evidence offered by Dr. Allan that indicate that bicarbonate is poorly effective to remove calcium ions to a substantial extent. Given Haslop's definition of a builder (i.e., the requisite properties of a builder for Haslop's systems), as quoted supra at page 3, and the recognized ineffectiveness of bicarbonate as a builder in Haslop's systems, one of ordinary skill in the art would find scant, if any,

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suggestion to use bicarbonate as a builder in place of sodium tripolyphosphate in the systems of Haslop.

Moreover, even if the prior art would have provided an adequate suggestion to one of ordinary skill in the art to substitute bicarbonate as a builder in the compositions of Haslop, the examiner still bears the burden of demonstrating that one of ordinary skill in the art would have had a reasonable expectation of successfully making the claimed pourable, homogeneous aqueous detergent composition with that substitution. The examiner argues specifically that:

pH values like 9.5 are not outside the teachings of the reference. At this pH it is possible to have the recited amounts of bicarbonate and have a composition that would not contain so much solids as to make it non-pourable.

A.8, lines 9-13. However, appellant has demonstrated that a bicarbonate:carbonate solution otherwise within the scope of his invention is not stable at pH 9.5, but undergoes phase separation. Van Blarcom declaration, item 11. In other words, the resulting composition would not be homogenous, and is not within the scope of appellant's claimed subject matter. At still lower pH, the builder and electrolyte efficiency of the solution drop due to the decreasing amount of carbonate. As we observed in our review of Haslop, supra, both building efficiency and

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as α -chloronaphthalene: Frary, Ger. pat. 309,618 (1918); *Chem. Zentr.* 1919, II, 55.

Yellowish-green, long, rhombic needles from benzene. Stable to air. d_4^{20} 2.03. mp 172.5°. bp 407.5°. Insol in cold water. Dec by hot water, yielding H_2S . Soly in carbon disulfide (20°): about 60% (w/w). Sol in benzene, similar hydrocarbons, phosphorus trichloride. LD orally in rabbits: 100 mg/kg. *Handbook of Toxicology*, vol. 1, W. S. Spector, Ed. (Saunders, Philadelphia, 1956) pp 236-237.

USE: In match tips.

8956. Tetrasilane. Tetrasilicon decahydride; silicobutane; tetrasilicane; tetrasilicobutane. $H_{10}Si_4$; mol wt 122.44. H 8.24%, Si 91.76%. Si_4H_{10} . Prepn by the action of hydrochloric acid on magnesium silicide: Stock, Somiesky, *Ber.* 49, 111 (1916); 54B, 524 (1921); 56B, 247 (1923); Stock *et al.*, *Ber.* 56, 1695 (1923); Emeleus, Maddock, *J. Chem. Soc.* 1946, 1131.

Liquid. mp approx -90°; bp 109°; vapor pressure 7.8 mm Hg at 0° (Stock *et al.*, loc. cit.). mp -84.3°; bp (calc) 107.4°; vapor pressure 9.1 mm Hg at 0° (Emeleus, Maddock, loc. cit.). d_4^{20} 0.825. Dec at room temp; explodes in air. Reacts vigorously with CCl_4 and $CHCl_3$. Dec in water.

8957. Tetrasodium Pyrophosphate. TSPP; pyro; sodium pyrophosphate. $Na_4O_7P_2$; mol wt 265.94. Na 34.59%, O 42.11%, P 23.29%. $Na_2P_2O_7$. Available alkalinity as Na_2O 4.4%, total alkalinity 22.7%. Produced by molecular dehydration of dibasic sodium phosphate at 500°: Bell, *Inorg. Syn.* 3, 98 (1950).

Crystals, d 2.534. mp 988°. Soly in water (g/100 ml) at 0°: 2.61; at 25°: 6.70; at 100°: 42.2. pH of a 1% soln = 10.2. Hydrolyzes to orthophosphate in aq soln, but the rate of hydrolysis is much slower than for the more acid pyrophosphate. No noticeable hydrolysis within 60 hrs at 70°: Bell, *Ind. Eng. Chem.* 39, 136 (1947).

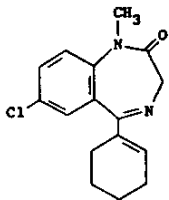
Decahydrate, crystals, d 1.82. mp 79.5°. Slight efflorescence in dry air. Soly in water (g/100 ml) at 0°: 3.16; at 20°: 6.23; at 25°: 8.14; at 60°: 21.83; at 80°: 30.04. pH of 1% soln at 25° = 10.2. Insol in alc.

USE: In cleansing compds, oil-well drilling, water treatment, cheese emulsification, as general sequestering agent, to remove rust stains, as ingredient of one-fluid ink eradicators, in electrodeposition of metals.

8958. Tetrasulfur Tetranitride. Schwefelstickstoff. N_4S_4 ; mol wt 184.27. N 30.41%, S 69.59%. S_4N_4 . Prepn by the interaction of disulfur dichloride and ammonia: Becke-Goecking, *Inorg. Syn.* 6, 124 (1960).

Orange-red, monoclinic needles from benzene, mp 178°. Additional purification by sublimation in high vacuum (bath temp 100°), mp 180°. bp₁₀ ca. 185°. Further heating results in deflagration and explosion. Practically insol in cold water, hydrolyzed by boiling water. Slightly sol in benzene, abs ethanol, carbon disulfide. *Handle with caution:* May dec explosively on striking or at temps much above 100°.

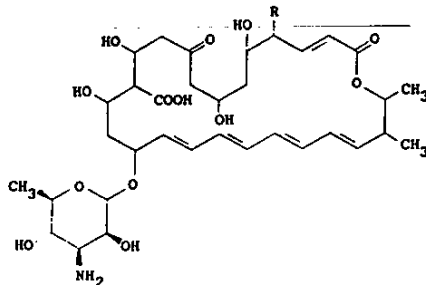
8959. Tetrazepam. 7-Chloro-5-(1-cyclohexen-1-yl)-1,3-dihydro-1-methyl-2H-1,4-benzodiazepin-2-one; 7-chloro-5-(1-cyclohexenyl)-1-methyl-2-oxo-2,3-dihydro-1H-[1,4]-benzo[*f*]diazepine; BC 4261; Myolastan. $C_{18}H_{17}ClN_4O$; mol wt 288.78. C 66.55%, H 5.93%, Cl 12.28%, N 9.70%, O 5.54%. Prepn: Schmitt, *Neth. pat. Appl.* 6,600,095 and U.S. pats. 3,426,014; 3,551,412 (1966, 1969, 1970 to Clin-Byla). Synthesis and pharmacology: Schmitt *et al.*, *Chim. Ther.* 2, 254 (1967). Spectroscopic and chromatographic studies of tetrazepam, its metabolites, and its acid hydrolysis products: Lafargue *et al.*, *Ann. Pharm. Franc.* 28, 343, 477 (1970).



Yellow-brown crystals from ethyl acetate, mp 144°. uv max (ethanol): 227 nm (ϵ 28,500). LD₅₀ in mice: 415 mg/kg i.p.; 2000 mg/kg orally.

THERAP CAT: Tranquilizer; muscle relaxant.

8960. Tetrin. Antifungal antibiotic produced by *Streptomyces Illinois* #155-2: Pote, *Diss. Abstr.* 19, 2778 (1959); Gottlieb, Pote, *Phytopathology* 50, 817 (1960). Isols of the two tetraenes, tetrin A and B: Rinehart *et al.*, *Ann.* 668, 77 (1963); German, *Diss. Abstr.* 25, 97 (1964). Structure of tetrin A: Pandey *et al.*, *J. Am. Chem. Soc.* 93, 3738 (1971); of tetrin B: Rinehart *et al.*, *ibid.* 3747. Mode of action of tetrin A: van Etten, Gottlieb, *J. Gen. Microbiol.* 46, 377 (1967).



Tetrin A. $C_{34}H_{51}NO_{13}$. R = H. Fine, colorless needles from methanol or aqueous *n*-butanol, mp > 350° (dec). $[\alpha]_D^{25} + 8.3^\circ$ ($c = 0.72$ in pyridine). $[\alpha]_D^{25} + 27.5^\circ$ ($c = 1.0$ in pyridine). uv max: 214, 278, 290, 303, 318 nm ($E_{1\%}^{1\text{cm}}$ 19.4, 44.2, 81.2, 115.0, 110.9). Monobasic, pK_a 8.30 in 60% ethanol. Sol in pyridine, dil alkalis, dil mineral acids; moderately sol in lower alcohols; practically insol in acetone, ether, water.

Tetrin B. $C_{34}H_{51}NO_{14}$. R = OH. Brown, amorphous powder, mp > 360° (darkens at 160-165°, blackens at 250-295°). $[\alpha]_D^{25} + 43.5^\circ$ ($c = 0.14$ in methanol); $[\alpha]_D^{25} + 45^\circ$ ($c = 0.3$ in pyridine). uv max: 214, 278, 290, 303, 318 nm ($E_{1\%}^{1\text{cm}}$ 18.6, 51.4, 80.1, 112.8, 108.9). Readily sol in ethanol + water, dioxane + water; fairly sol in water, lower alcohols, dioxane, pyridine, dimethyl sulfoxide; slightly sol in acetone. Practically insol in ethyl acetate, chloroform, ether, ethylene dichloride.

8961. Tetrodotoxin. Octahydro-12-(hydroxymethyl)-2-imino-5,9,7,10a-dimethano-10aH-[1,3]dioxocino[6,5-*d*]pyrimidine-4,7,10,11,12-pentol; spheroidine; tarichatoxin; tetrodotoxin; fugu poison; TTX. $C_{11}H_{17}N_5O_8$; mol wt 319.28. C 41.38%, H 5.37%, N 13.16%, O 40.09%. Toxin from the ovaries and liver of many species of *Tetraodontidae*, esp the globe fish (*Spheroideus rubripes*): Yokoo, *J. Chem. Soc. Japan* 71, 590 (1950), *C.A.* 45, 6759c (1951). Identity with tarichatoxin: Buchwald *et al.*, *Science* 143, 474 (1963). Structure studies: Goto *et al.*, *Tetrahedron Letters* 1963, 2105, 2115; 1964, 779, 1831. Structure: Woodward, *Pure Appl. Chem.* 9, 49 (1964); Tsuda *et al.*, *Chem. Pharm. Bull.* 12, 1357 (1964); Goto *et al.*, *Tetrahedron* 21, 2059 (1965). Synthetic studies: Kishi *et al.*, *Tetrahedron Letters* 1970, 5127, 5129. Total synthesis: Kishi *et al.*, *J. Am. Chem. Soc.* 94, 9219 (1972). Pharmacology: Evans, *Brit. Med. Bull.* 25, 263 (1969); Kao, *Fed. Proc.* 31, 1117 (1972). Mechanism of action: Narahashi, *ibid.* 1124. Review: Scheuer, *Fortschr. Chem. Org. Naturst.* 22, 265 (1964); Mosher *et al.*, *Science* 144, 1100 (1964); Kao, *Pharmacol. Rev.* 18, 997 (1966); Evans, *Int. Rev. Neurobiol.* 15, 83 (1972).

